tube, and the date of filling. Something more exact than the commercial name of the glass would be needed in stating the former, but both of these particulars might with propriety be engraved on the tube. LEONARD WALDO

Yale College, New Haven, May 11

"How to Prevent Drowning"

ONE further hint may be added to those of Mr. MacCormac. It is as simple as practical, although it may not have been before recommended in print.

When a person is thrown into the water from an elevation the body sinks for a time, and may not rise quickly to the surface to permit fresh breath to be taken. In that case shut the lips firmly to prevent the escape of the breath, and swallow the breath. This is the art of the diver; it comes naturally to him when he seeks to prolong his stay under water; but it may not as readily occur to one unskilled in diving, whose only desire is to reach the surface. The act of gulping down the breath may be repeated three or four times, and thus protract the chances of escape.

Although every one may tread water, fresh or salt, Mr. Hill is undoubtedly right in saying that all cannot float upon fresh water without assistance from their hands or feet. Not one in ten can do so. When the swimmer shows his toes above the surface his hands are in constant action below, turning half-way round from the wrist and back again, to change the fulciment.

WM. CHAPPELL

Stratford Lodge, Oatlands Park, Weybridge Station

THE bathing—I might almost say the drowning—season is now about to begin, and many lives will unhappily be lost. As the human frame, bulk for bulk, is lighter than water, all that is needful to save life is to permit the body to sink until it shall displace as much water as equals the body's weight. Then paddle gently, as the lower animals do, with hands and feet, the head being held erect, wherever it is desired to go. This direction being carried out is absolutely all that is needful under ordinary conditions to preserve life. These few directions ought to be stuck up in every bathing-place—every boating- and skating-place — in the three kingdoms. Children in every instance ought to be made to tread water from the earliest age, say in shallow slate baths with blood-warm water, or, when convenient and suitable, in some river, pond, or in the open sea. A leather belt with ring, and a stout rod with line and hook, are employed by Portuguese mothers to instruct their children. The mother, rod in hand, stands on the brink; the child learns in the water. In Paris swimming-schools the same procedure is resorted to. The business cannot be begun too soon. I saw mere infants sustaining themselves perfectly in the tepid waters of Africa. Treading water is far safer than swimming in a broken sea. Every adult, man or woman, who has not practised it should begin. Once the conviction instilled that the body is lighter than water, the risk of drowning is reduced to zero. The process involves no uncertainty, no delay. Very different from swimming, it can be acquired at once.

Belfast, May 25 HENRY MACCORMAC

Optical Phenomenon

MR. MURPHY'S experience, described in NATURE, vol. xxiv. p. 80, is general enough. It was observed by Fechner in 1860, and is now commonly associated with his name, though Prof. Brücke of Vienna had also seen and explained the very same phenomenon some years before that. Nor was he the first, for, according to Aubert, there is a still earlier account due to Brewster in *Poggendorff's Annalen* for 1833.

Fechner's side-window experiment, as it is called, is best seen by employing a scrap of white paper on a black ground, or *vice versâ*, the eyes being accommodated for some other distance, so that double images of the paper are secured. Care must also be taken that the light from the window enters the nearer eye only through the sclerotic, so as to receive a reddish tinge. This diffused reddish light renders the eye after a short time comparatively insensitive to red, so that the light reflected from the white paper appears greenish, the black paper alone, from which no light is reflected, appearing of the reddish tinge. In contrast with this, in the other eye, which is sheltered by the nose from the window-light, the white light appears reddish, and the black greenish. Some little time is required for the illuminated eye to be exhausted for red before the contrast is very striking. Such is Brücke's explanation; but who will explain to us this "subjective phenomenon of contrast"? JAMES WARD

Trinity College, Cambridge, May 29

An Optical Illusion

IF your correspondent, Mr. William Wilson, will refer to vol. xxxiii. of the "International Scientific Series," page 86, he will find given by Prof. Le Conte a full description and explanation of the ocular illusion to which he refers in his letter (NATURE, vol. xxiv. p. 53). The explanation is identical with that given by yourself. SAMUEL DREW

Chapeltown, Sheffield, May 24

Occurrence of Neolithic Implements at Acton, W.

IT may interest your readers to know that I discovered, last week, on the surface of a field south of the Priory at Acton, an abundance of Neolithic implements, precisely similar as regards form, type, size, and material to those which occur so abundantly in the neighbourhood of Beer and Sidmouth, in Devonshire. They occur also on a large field on the hill at Acton, west of the Wilesden Railway, and are formed of grey or black chalk flints, which—or the implements—have been imported. On a field south of the Priory I found a flat, circular, grey, quartzite, beach pebble, derived possibly from the Bunter Conglomerate of South Devon, similar to those of the Dorsetshire and Devonshire coasts. Such pebbles are of frequent occurrence on the surface of the fields in the Neolithic districts of Beer and Sidmouth, and have been used as hammer stones and missiles. The association of this pebble with implements so like in every respect to those of South-East Devonshire is very remarkable.

The occurrence of palæolithic implements in the drift of Acton has been known for some years. They occur in remarkable abundance in the high level gravels of this locality as well as in the low level gravels of Hammersmith, and one cannot fail to find in newly-spread gravel examples of the minor implements, such as flakes, drills, &c., and occasionally larger implements. A series of the neolithic implements of Acton I purpose depositing in the Jermyn Street Museum. Their discovery at this locality confirms the conjecture I had formed that neolithic implements might occur in the Thames Valley, from having found implements of neolithic type in the drift, into which they may have got washed. SPENCER GEO. PERCEVAL

21, Notting Hill Square, W., May 20

Birds Singing during Thunder

A THUNDER-STORM of great severity passed over us, travelling round from west to south, between 4 and 8 o'clock p.m., May 28, and killing a man in the open air three miles from my residence. The thermometer stood about 70° all the while. During the storm, and even when the thunder-peals were loudest, the chaffinches kept singing, and the blackbirds' notes alternated with the thunder-claps. The rain was moderate, and as the air filled with insects and perfume, the swallows kept busily, skimming even while forked lightning was flashing. Horses in the fields however exhibited symptoms of terror. J. SHAW

Tynron, Dumfriesshire

Fire-Balls

I HAVE read with great interest Prof. Tait's lecture on Thunderstorms, and have had recalled to mind a singular fireball which I had the fortune to see some years ago during a thunderstorm in Portugal. I have a perfect recollection of the phenomenon without referring to my journal of that date.

I was standing in a window on the second floor of the Hôtel Braganza (in Lisbon), which stands close to and high above the Tagus, and had an unbroken view of the river. There occurred a flash followed by an instantaneous crash, but the tail of the flash, however, gave origin to two balls, which descended separately and not far apart, towards the river, and when quite close to, or in contact with the water, burst in rapid sequence, with explosions which might have been the crack of doom.

Sumatra, April HENRY O. FORBES

Sound-Producing Ants

IN NATURE, vol. xxii. p. 583, which has lately reached me, I read a letter from Mr. Peal on sound-producing ants, and I

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can corroborate his observations. It is nearly two years since I noted this fact in a species of *Polyrachis*, which makes its papery nests on the under side of bamboo leaves. The noise, resembling very heavily-falling rain, is caused by the insect striking the leaf by a series of spasmodic taps, both with its head and with the extremity of its abdomen, which it *inflexes* while so doing.

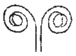
I came on a second large brown species in September last in Sumatra. The noise which, as in the case of the *Polyrachis*, resembled heavy rain, could be heard a long distance off. What struck me most about this species was the singular synchronism of the movements. These ants were spread over a space perhaps a couple of yards in diameter on the stem, leaves, and branches of a great tree which had fallen, and not within sight of each other; yet the tapping was set up at the same moment, continued exactly the same space of time, and stopped at the same instant; after the lapse of a few seconds all recommenced at the same instant. The interval was always of about the same duration, though I did not time it; each ant did not, however, beat synchronously with every other in the congeries nearest to me; there were independent tappings, so that a sort of tune was played, each congeries dotting out its own music, yet the beginnings and endings of these musical parties were strictly synchronous. HENRY O. FORBES

Sumatra, April

The Pitt-Rivers Collection: Bell-Clappers—the Tooth-Ornament

IN the account lately given in your columns of the Pitt-Rivers Anthropological Collection I find it stated, in speaking of bells: "The clapper is a late addition to the bell which does not exist in Japan or China." When in West Java a year ago I saw in the possession of a gentleman there a bronze (?) bell dug up on the site of one of the old Hindoo settlements, of which now only the graves remain. It had lost the clapper, but the hook, to which I have no doubt a clapper originally was attached, existed still. The form of the bell was much like those figured by Raffles in his "History of Java."

In speaking also of the development of ornamentation reference is made to the W pattern. In the Lampongs this is the most common and almost the only ornamentation. Its origin may possibly be as Mr. Low suggests; but farther up the country, where adornment is more frequent and varied, I find a very common pattern to be a circle ornamented all round the circumference with this toothed design, evidently, I think, representing the sun, and it is not improbable that on the circle being dropped where it could not well be introduced the "tooth-ornament" alone was retained.

Once travelling near Lake Doon, in the West of Scotland, I entered a lonely hut amid the mountains, where a woman was washing the floor—at least the stones set in it, for they were let into the mud at considerable distances apart. As she finished each stone she ornamented it with a piece of pipeclay with concentric circles, combining, where the stone was larger, two of these concentric ornaments into one by a stalk—as of a stem with two flowers on it . Did she still unwittingly retain the ornamentation of the European Bronze Period?

Sumatra, April HENRY O. FORBES

ON TOTAL SOLAR ECLIPSES OCCURRING BEFORE THE END OF THE PRESENT CENTURY

AT various times during the last six years we have given in our "Astronomical Column" particulars (including elements) of most of the total eclipses of the sun that will happen before the close of the nineteenth century. As the attention of many astronomers may soon be directed to arrangements for observing the eclipse on May 17th, 1882, we present here, in a collective form, the principal characteristics of such phenomena during the interval in question, which are likely to possess special interest under the circumstances. We shall refer to twelve eclipses, commencing with that of the ensuing year.

(1) 1882, MAY 17.—The most accessible positions on the central line will be in Upper Egypt and the extremity of the peninsula of Sinai about Sherm, but the duration of totality will be greater in the vicinity of Teheran. Where the central eclipse crosses the Nile, totality will commence at about 8h. 33m. a.m. local mean time, continuing 1m. 12s. According to General Stebnitzki's recent determination of the geographical position of the apparatus-room of the Indo-European Telegraph at Teheran, the central line will pass 8′ to the south of it, and here the duration of total eclipse will be 1m. 44s., which may be considered the longest available on this occasion: the sun's altitude will be 67°. The central eclipse passes off the Asiatic coast near Shanghai, running about 18′ north of that place; a direct calculation for Shanghai shows a partial eclipse only, greatest at 5h. 21m. p.m., magnitude 0·996, while at the neighbouring meteorological observatory of Zi-ka-wei, the eclipse is also partial, magnitude 0·994. On the central line in the longitude of Shanghai, the total eclipse continues only 35s. with the sun at an altitude of 18°.

(2) 1883, MAY 6.—In this case we have an eclipse where the totality will extend to nearly six minutes, but unfortunately this long duration falls upon the Pacific Ocean, and it does not appear that there is any land where it can be observed. By the Admiralty chart of the Marquesas, a duration of 2m. 53s. might be available on the Island Fetou-houhou, or Chanel Island, the sun at an altitude of 63°, and totality commencing about 0h. 42m. local mean time. At the head of Anna Maria Bay, Nouka-hiva, there is a partial eclipse only, magnitude 0·97. The central line lies wholly upon the Pacific: greatest duration of total phase 5m. 56s. in about 147° W. and 9° S.

(3) 1885, SEPTEMBER 8.—Observable in New Zealand soon after sunrise. In the longitude of Wellington the duration of totality will be 1m. 55s., with the sun at an altitude of 15°, at Wellington itself the duration will be hardly 40s.; the central line passes some forty-five miles to the north. The greatest eclipse falls in mid-Pacific in 58° S. latitude,

(4) 1886, AUGUST 29.—Totality will continue longer in this eclipse than in any other occurring within the interval which we are considering, but again it will happen that the greatest durations fall on the ocean, in this case upon the Atlantic. At the southern extremity of the Island of Grenada, or in 61° 35′ W. and 11° 59′ S. there will be a total eclipse with the sun at an altitude of nearly 20°, commencing at 7h. 10m. a.m. local mean time and continuing 3m. 15s. In 14° 13′ W. and 2° 58′ S. the sun will be upon the meridian at the middle of the eclipse, and totality will last for 6m. 27s. The central line meets the African coast in about 12° 14′ S. and here the duration of the total phase will be about 4m. 38s., with the sun at an altitude of 39°. [This eclipse is a recurrence of that of 1868, August 18, when the central line passed across Hindostan from near Kolapore to Masulipatam, where the duration of totality was 5m. 45s., but attained a maximum of 6m. 46s. on the west coast of the Gulf of Siam. At its next recurrence, 1904, September 9, the total phase continues 6m. 19s. but in mid-Pacific longitudes a little south of the equator. On September 21, 1922, though there is no land where the totality will be longest, a duration of about 3½ minutes will be available on the east coast of Australia.]

(5) 1887, AUGUST 19.—It was long supposed that the central line in this eclipse would extend to England, but it appears to commence in 11° 39′ E. and 51° 38′ N. It will be most favourably observed in Asiatic Russia, but some fifty miles north of Moscow the total eclipse will continue 2m. 30s. with the sun at an altitude of 17°, and this is perhaps the most westerly station that observers should be induced to fix upon. In Moscow the duration would seem to be about one minute. At Berlin the sun will be totally eclipsed immediately after rising. On Lake Baikal

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